Tuesday, January 21, 2020

OPTICS Tech Pulse

January 2020

Optics Tech Pulse is a special edition newsletter from Photonics Media and Bristol Instruments Inc. covering key developments in optics technology.

Innovative Design of Optical Systems Boosts Industrial Metrology

State-of-the-art metrology and vision systems deliver a vast amount of spatially and spectrally resolved information, requiring the optical front end to operate at higher performance than ever before. In more recent years, increasing use of image sensors has rapidly driven camera chip evolution in many aspects: resolution, sensitivity, signal-to-noise ratio, speed (frame rate), and fill factor among them.

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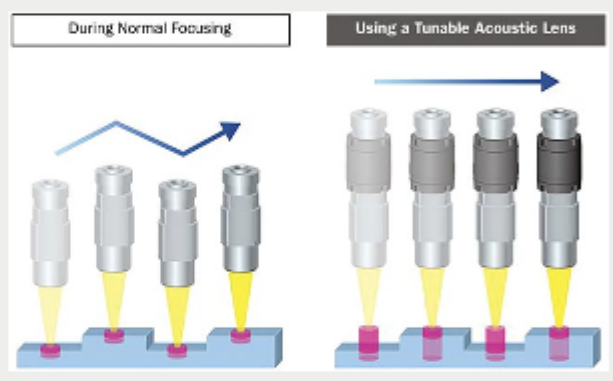
High-Speed 3D Inspection with Liquid Lenses

The concept of liquid lenses, which involves controlling the shape of a liquid to alter the properties of a lens, is not new. Researchers and engineers have commercialized the technology so that liquid lenses can be incorporated into microscopes, metrology inspection systems, cellphone cameras, diagnostic equipment, and more.



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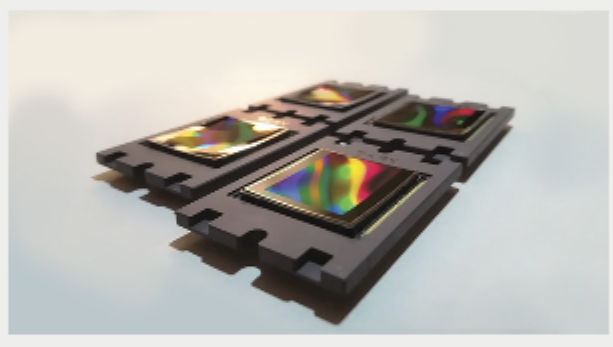
Optimizing Freeform Optics

One part of space-based imaging with room for optimization is the optics. For over a century, manufacturers have used nearly the same grinding and lap polishing techniques to create the optics in imaging systems, but recent revolutionary fabrication advancements mean optical designers have room to extemporize. Enter freeform optics.



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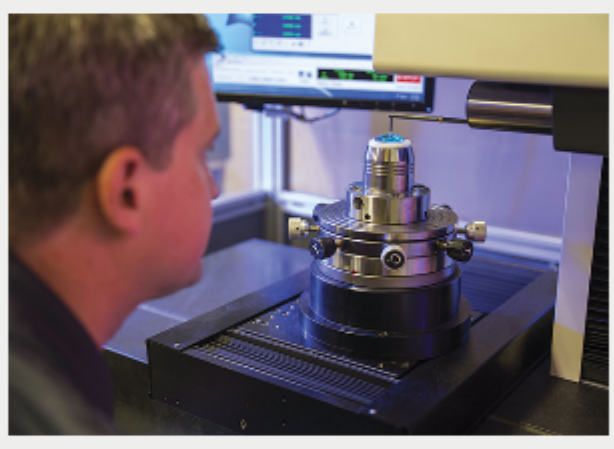
Measuring Aspheres: Selecting 2D or 3D Metrology

An understanding of 2D and 3D metrology can help designers and manufacturers make the right choices when characterizing aspherical lenses. As aspheres become more prevalent in optical systems and more companies design systems that include them, it is crucial that both designers and manufacturers understand what is needed and what the limitations are in regard to metrology.



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Display Manufacturing Enriches Consumer Products

The dichotomy of product requirements between large-screen TVs and advanced smartphones (in addition to tablets, computer monitors, and so on) — and the expectation that both will offer sharp, vivid images — means manufacturing is turning to tighter and tighter tolerances. None of this would be possible without rapidly evolving inspection technologies keeping pace to detect microscopic imperfections in the submicron range.

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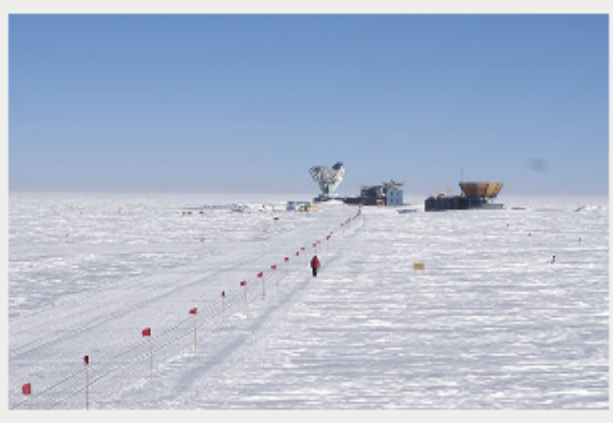
Imaging the Oldest Light in the Universe with the BICEP Array

The abilities to map and characterize relic light and better understand the origins of the universe are enabled with exceptional instruments and collaborations. Since the discovery of the CMB, the oldest relic light in the universe, experimental cosmologists the world over have developed advanced technologies to measure this light with increasing precision.



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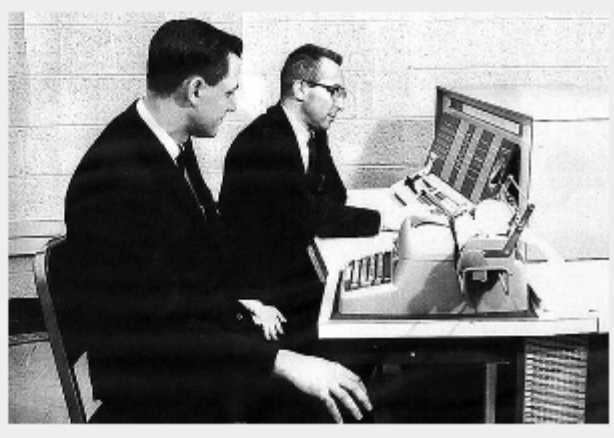
Looking Back: A Lens Designer Remembers

Nearly 57 years ago, in 1962, I began work as an optical engineer with General Electric (GE) in Scranton, Pa. As an engineering technician, I worked with GE's senior optical engineer, Don Kienholz. The computer system we used at the time included a specialty software package that had lens design and optimization capabilities.



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